STANDARDS DEVELOPMENT BRANCH ONOE
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Laundry Industry Pollution Prevention Workshop

Program

March 1, 1994

at the Ontario MOEE Brampton Training Centre

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1994
MOE

Ontario Laundry Industry Pollution Prevention Task Force

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Ontario Laundry Industry Pollution Prevention Task Force

17874

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Task Force Description

Agenda

Resource Materials

- Presentation Notes
- Sources of Information - equipment suppliers, consultants, etc.
- Draft Pollution Prevention Practices for Textile Laundry Facilities
- Registered Participants

Ontario Laundry Industry Pollution Prevention Task Force

The Ontario Laundry Industry Pollution Prevention Task Force is a group consisting of the Ontario Ministry of Environment and Energy, Metro Toronto, City of Brantford, and laundries including Cadet Uniform Service, Canadian Linen Supply Co. Ltd., Langley Parisian Ltd., Topper Linen Supply Co. Ltd. and Work Wear Corporation of Canada Ltd., some of which represent the laundry associations DCLI (Dry Cleaners and Launderers Institute) and TRIO (Textile Rental Institute of Ontario).

This group has been meeting on a regular basis. It has expanded from its original purpose of providing input into municipal oil and grease limits to promoting voluntary prevention within the laundry industry sector. The Task Force welcomes input from other operators in the laundry sector.

Ontario Laundry Industry Pollution Prevention Workshop
March 1, 1994

Agenda

9:30	Coffee
10:00	Welcome
10:05	Description of the Laundry Industry Pollution Prevention Task Force *Ken Adamson, Langley Parisian Ltd.* *Stan Landry, Canadian Linen Supply* *Vic Lim, Metro Toronto*
10:20	Overview of Pollution Prevention *Bruce Gillies, Pollution Prevention Office, MOEE*
10:35	Overview of MISA Municipal Regulations *Stephen Neville, Municipal Section, MOEE*
10:50	Operating Tips for Smaller Operators *Ken Adamson, Langley Parisian Ltd.*
11:20	Approaches to reducing waste: Pollution Prevention Management Techniques and Technology *Frank Koletar, Work Wear Corp. of Canada* *Bruce Gillies, Pollution Prevention Office, MOEE*
12:00	Sandwich Break
1:00	Discussion on scheduling other industry specific help sessions
1:50	Wrap up

PRESENTATION NOTES

POLLUTION PREVENTION

Any Action Which REDUCES OR ELIMINATES THE CREATION OF POLLUTANTS

Embraces Resource Conservation

Achieved Through Activities Which Promote, Encourage or Require Changes in Basic Operational or Behavioural Patterns of Industrial, Commercial, Institutional, or Individual Generators

POLLUTION PREVENTION

IS ACHIEVED BY:

→ RAW MATERIAL SUBSTITUTION

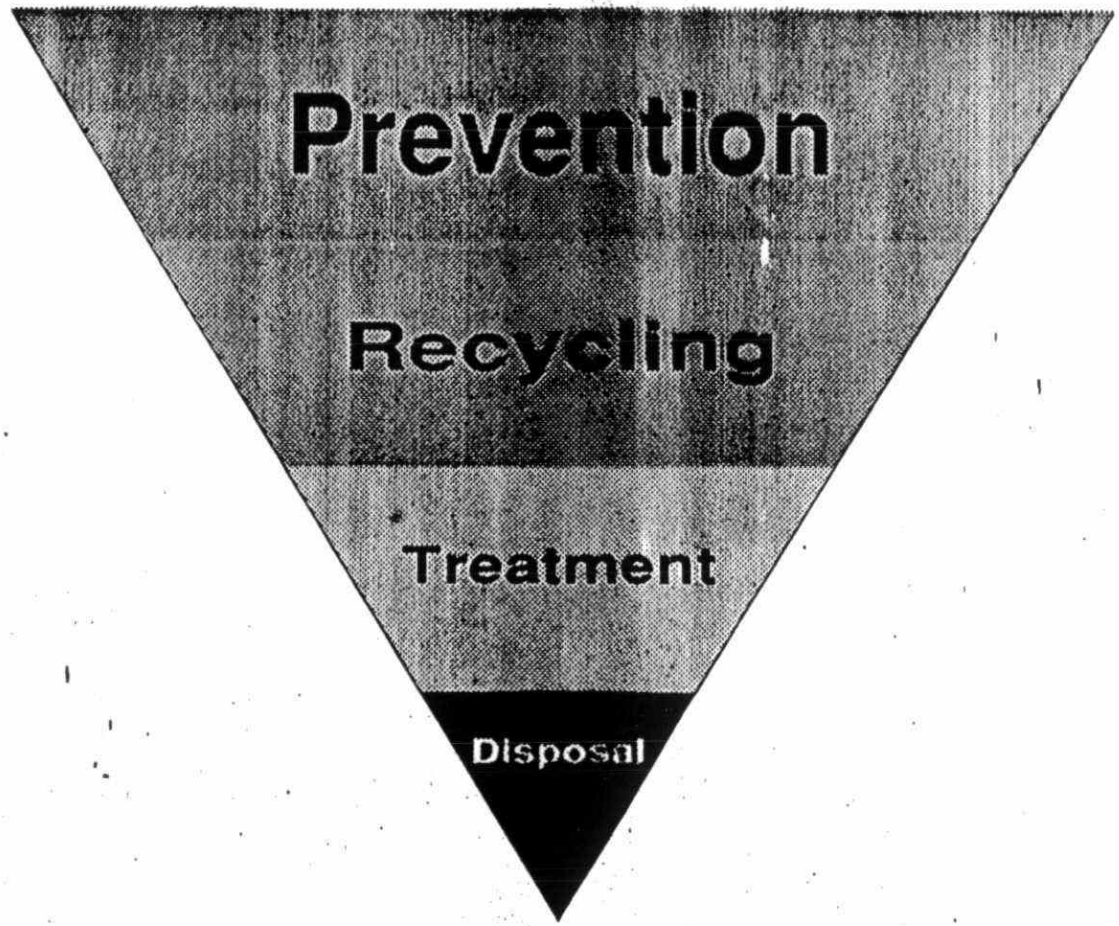
→ PRODUCT REFORMULATION

→ PROCESS REDESIGN OR MODIFICATION

→ IN PROCESS RECYCLING

→ IMPROVED MAINTENANCE AND OPERATIONS

Pollution Management Hierarchy



MOEE Pollution Prevention Office - Corporate Programs

- Pollution Prevention Pledge Program (P^4)

- Implementation Partnerships: Industrial
 - Automotive Manufacturing Sector
 - Metal Finishing Sector
 - Automotive Parts Manufacturing Sector
 - Pulp and Paper Sector
 - Canadian Chemical Producers Association

- Implementation Partnerships: Community
 - Regional Municipality of Hamilton-Wentworth
 - Emery Creek Community Program

- Technical Partnerships
 - **Industrial Laundry Sector**
 - Printing Sector
 - Food Processing Sector
 - Restaurant Association
 - Photofinishing Sector
 - Automotive Servicing Sector

Pollution Prevention

Benefits for Laundries

- Improved competitiveness through efficient use of resources
- Economic return
- Reduced liability
- Improved environmental performance
- Protect the environment
- Good public image and marketing tool

Pollution Prevention Program Evolution

Beginning
- "picking the low-hanging fruit"
- immediate improvements in operating efficiency (housekeeping, maintenance, operating procedures)
- relatively small investment
- relatively high ROI

Growing
- near term changes (1-5 years)
- upgrading existing processes using existing technology
- medium investment, medium ROI
- requires testing, C of A changes, installation of new equipment.

APPROACHES TO REDUCING WASTE IN LAUNDRIES:

POLLUTION PREVENTION MANAGEMENT TECHNIQUES

AND TECHNOLOGY

Frank Koletar, Work Wear Corporation of Canada Ltd.
Bruce Gillies, Pollution Prevention Office, Ontario MOEE

This presentation is intended to provide guidance for laundry operators in POLLUTION PREVENTION and selecting appropriate equipment for reducing waste discharges.

Although pollution prevention is the desired method of eliminating waste, end-of-pipe treatment may be required to maintain compliance with air, solid and water waste discharge regulations.

Pollution Prevention Planning for Textile Laundry Facilities

1) **Establish a written environmental policy statement**

Why implement pollution prevention/best possible management practices? What will be done? Who will implement it?

2) **Establish a team within the facility to identify opportunities.** Include people from the different areas of the business.

ie. - facility manager
- operator
- route sales
- shipping/receiving
- accounting

3) **Do a preliminary assessment**

- Gather information
- Review the work site
- Identify opportunities
- Establish priorities

4) **Options**

- Identify
- Evaluate
- Implement

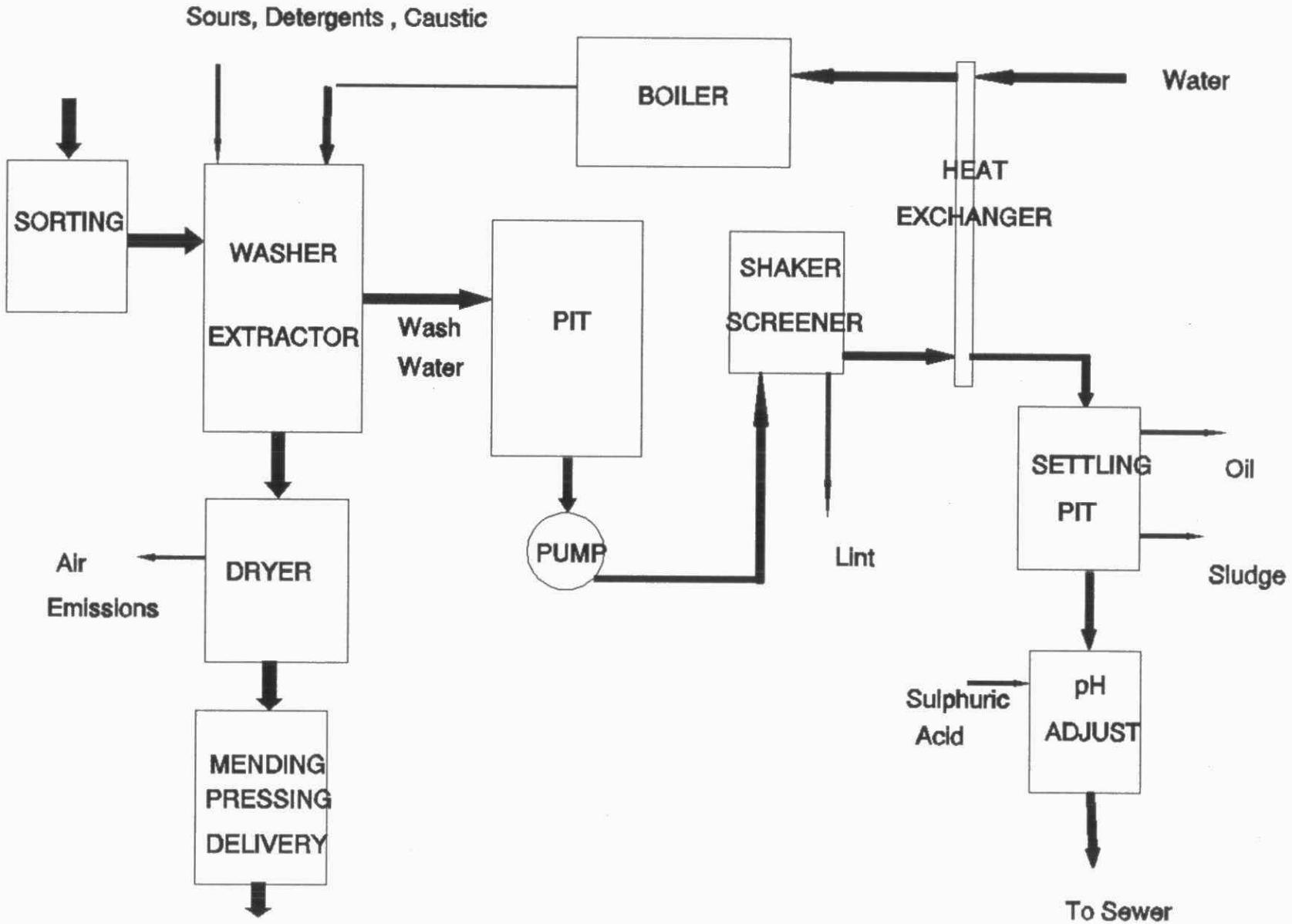
Preliminary Assessment

Gather Information

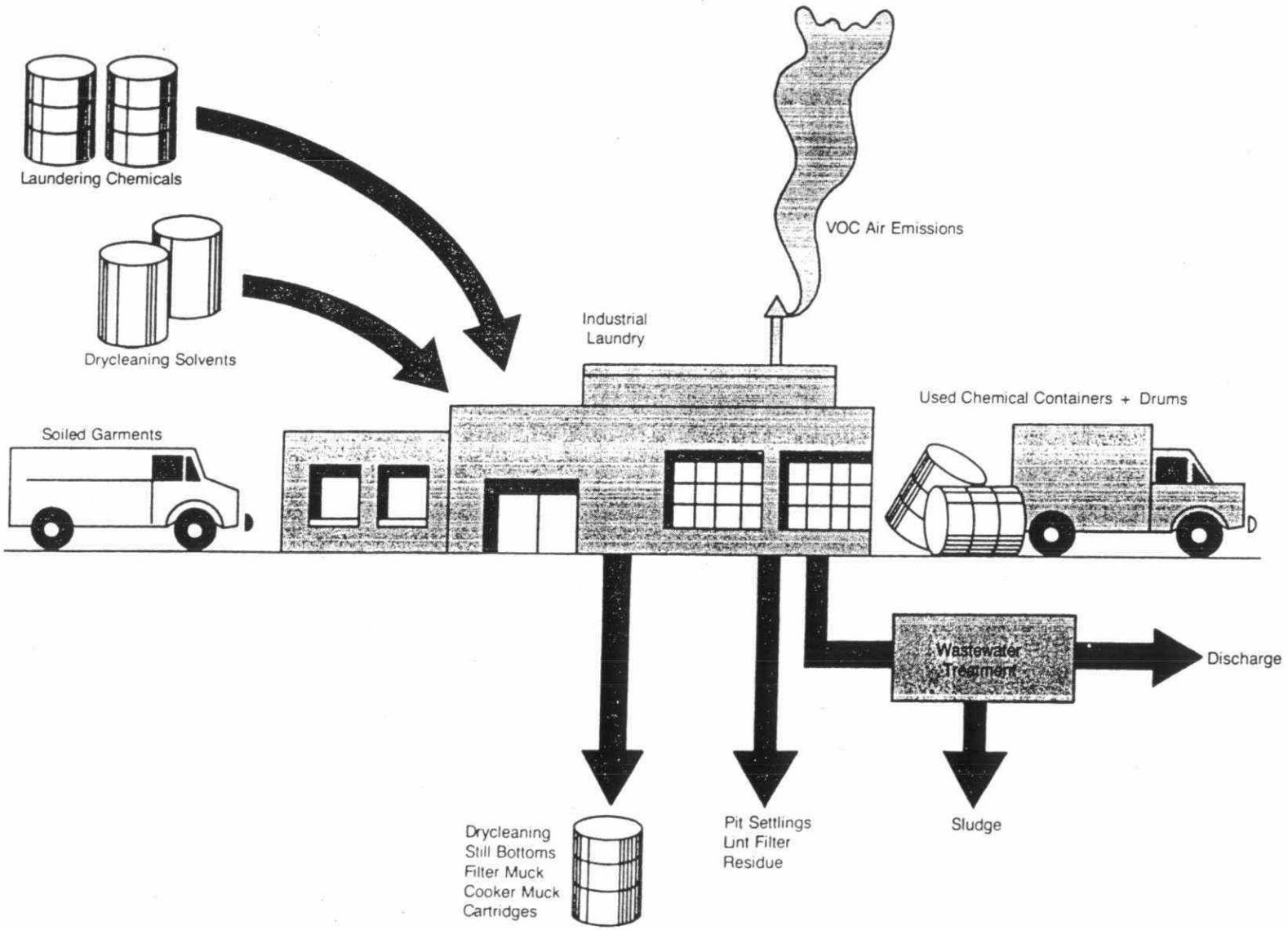
- Make a general plant flow diagram.

 - List inputs/outputs
 - amounts
 - material costs
 - waste sources

 - this will provide gross #'s and $'s so that you can focus on the big cost items.


Sours, Detergents , Caustic
BOILER
Water
HEAT
EXCHANGER
SORTING
WASHER
EXTRACTOR
Wash
Water
PIT
SHAKER
SCREENER
SETTLING
PIT
Oil
Sludge
Air
Emissions
DRYER
PUMP
Lint
Sulphuric
Acid
pH
ADJUST
MENDING
PRESSING
DELIVERY
To Sewer

Origin and Disposition of Hazardous Materials in Industrial Laundry Operations



Potential Sources of Pollutants to the Laundry

- Laundering Chemicals
- Drycleaning Solvents and Chemicals
- Soiled Textiles

Toxic Pollutant Concentrations in Industrial Laundry Wastewaters

Pollutant	Ratio of Presence*	Concentration (mg/1) Minimum**	Maximum	Median**	Mean**
Inorganics					
Antimony	20/22		1.8	0.14	0.24
Arsenic	14/24		1.6	0.017	0.077
Beryllium	1/14		0.005	<0.001	<0.001
Cadmium	32/36		0.52	0.066	0.088
Chromium	32/35		8.8	0.44	0.88
Copper	26/36	0.070	11.0	1.2	1.7
Lead	25/36		22.0	3.2	4.5
Mercury	22/24		0.019	0.001	0.002
Nickel	31/36		2.4	0.16	0.29
Selenium	2/16		0.12	<0.001	0.008
Silver	11/16		0.13	0.005	0.026
Zinc	36/36	0.100	9.0	2.4	3.0
Cyanide	19/28		1.0	0.026	0.14
Organics					
Phenol (total)	17/19		1.5	0.18	0.32
Benzene	11/18		23.4	0.012	2.5
Carbon tetrachloride	2/18		1.7		0.095
1,1,1-trichloroethane	5/18		6.6		0.37
2-chloronaphthalene	1/19		0.017		0.0009
p-chloro-m-cresol	1/19		≤0.010		≤0.0005
Chloroform	14/18		34.6	0.015	3.3
Dichlorobenzenes	1/19		1.1		0.058
2,4-dimethylphenol	2/19		0.46		0.025
Ethylbenzene	8/18		17.5		1.10
Methylene chloride	7/18		0.54		0.046
Dichlorobromomethane	2/18		0.02		0.002
Trichlorofluoromethane	1/18		0.003		
Isophorone	1/19		0.19		0.010
Napthalene	10/19		4.8	0.023	0.79
N-Nitrosodiohenylamine	1/19		1.8		0.095
Phenol	6/19		0.84		0.089
Bis(2-ethylhexyl) phthalate	16/19		17.5	0.56	3.1
Butyl benzyl phthalate	3/19		1.5		0.096
Di-n-butyl phthalate	8/19		0.82		0.10
Di-n-octyl phthalate	4/19		0.41		0.035
Diethyl phthalate	1/19		≤0.010		≤0.0005
Anthracene/phenanthrene	4/19		0.47		0.047
Perchloroethylene	13/18		93.2	0.084	9.1
Toluene	17/18		50.9	1.0	5.2
Trichloroethylene	8/18		0.80		0.12

*Ratio indicates the number of samples in which the specific pollutant was found compared with the total number of samples analyzed.

**Blanks indicate values below analytical detection limits.

Industries / Toxic Materials	Arsenic	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Electroplating		•	•		•		•
Photographic Processes		•		•	•	•	•
Organic Chemicals				•	•	•	•
Glass/Ceramic	•	•		•	•	•	•
Battery		•		•	•		
Electronics/Components		•		•	•	•	
Printing		•		•			•
Paints/Varnishes		•	•	•	•		
Pharmaceutical					•		
Plastics				•			
Petroleum Products				•			
Leather Tanning			•				
Rubber						•	
Dyes				•			

Typical Vehicle Maintenance Operations Which May Generate Hazardous Wastes

Typical Process/ Operation	Typical Materals Used	Typical Material Ingredients on Label	General Types of Wastes Generated
Oil & grease removal	degreasers—(gunk), carburetor cleaners, engine cleaners, varsol, solvents, acids/alkalies	petroleum distillates, aromatic hydro-carbons, mineral spirits	ignitable wastes, spent solvents, combustible solids, waste acid/alkaline solutions
Engine, parts and equipment cleaning	degreasers—(gunk), carburetor cleaners, engine cleaners, solvents, acids/ alkalies, cleaning fluids	petroleum distillates, aromatic hydro-carbons, mineral spirits, benzene, toluene, petroleum naphtha	ignitable wastes, spent solvents, combustible solids, waste acid/alkaline solutions
Rust removal	naval jelly, strong acids, strong alkalies	phosphoric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide	waste acids, waste alkalies
Paint preparation	paint thinners, enamel reducers, white spirits	alcohols, petroleum distillates, oxygenated solvents, mineral spirits, ketones	spent solvents, ignitable wastes, ignitable paint wastes, paint wastes with heavy metals
Painting	enamels, lacquers, expoxies, alkyds, acrylics, primers	acetone, toluene, petroleum distillates, expoxy ester resins, methylene chloride, xylene, VM&P naphtha, aromatic hydrocarbons, methyl isobutyl ketones	ignitable paint wastes, spent solvents, paint wastes with heavy metals, ignitable wastes
Spray booth, spray guns, and brush cleaning	paint thinners, enamel reducers, solvents, white spirits	ketones, alcohols, toluene, acetone, isopropyl alcohol, petroleum distillates, mineral spirits	ignitable paint wastes, heavy metal paint wastes, spent solvents
Paint removal	solvents, paint thinners, enamel reducers, white spirits	acetone, toluene, petroleum distillates, methanol, methylene chloride, isopropyl alcohol, mineral spirits, alcohols, ketones, other oxygenated solvents	ignitable paint wastes, heavy metal paint wastes, spent solvents
Used lead acid batteries	car, truck, boat, motorcycle, and other vehicle batteries	lead dross, less than 3% free acids	used lead acid batteries, strong acid/ alkaline solutions

Prior to soiled textiles arriving at the laundry:

- Assess your customer base to determine where your troublesome parameters are coming from:
 mineral oil can come from automotive, miscellaneous industrial, manufacturing customers...
 solvents can come from printers, furniture finishers...

- customers may switch to less toxic solvents etc.

- ensure that no free liquids are transported to the laundries.

- working with customers is the most effective method to eliminate free liquids

Textile Handling Practices

For Laundry Customers Using Wiping Towels

DO's

- ✓ Use non-hazardous cleaning solvents whenever possible.
- ✓ Ensure no towels bearing free liquids are placed in soiled towel containers.
- ✓ Wring out soiled towels before placing in collection containers, either by hand or with a mechanical device.
- ✓ If excess liquid collects at the bottom of the container, decant into a waste collection drum and manage the liquid appropriately.
- ✓ Share your Material Safety Data Sheets with the laundries.



DON'Ts

- ☹ Don't air dry soiled wiping towels.
- ☹ Don't dispose of excess chemicals by pouring onto towels.
- ☹ Don't pre-wash wiping towels on your own.



Processing

- Chemicals
- Standard of Consumption
- Reduce, Reuse, Recycle, Recover

In Plant - Management Practices

- Training
- Washing Chemicals
- Water Conservation/ Energy Conservation
- Maintenance & Preventative Maintenance
- Good Housekeeping
- Solid Waste Management

Training

- in plant - safety, waste reduction awareness
- suppliers - toxics use reduction
- customers - free-liquid elimination

Washing Chemicals

- Learn what chemicals are in your washes, breaks. Request and look at the Material Data Safety Sheets (MSDS) from your suppliers.

- review chemical use - process chemicals
 - treatment chemicals

- review toxic use reduction in all process and treatment chemicals periodically with your suppliers

- handling and storage to avoid health hazards, spills

- automate metering of wash chemicals

- receive chemicals in reusable totes

- inventory controls
 - 1st in --> 1st out

Water Conservation/ Energy Conservation

- use discharge water to pre-heat fresh water

- use warm water instead of cold water for rinsing,
 --> more effective rinsing, decrease in rinse time
 and volume of water used

- reuse wastewater

- use exhaust gas from dryers to pre-heat inlet air

- install high efficiency lighting in plant

Maintenance & Preventative Maintenance

- eliminate leaks - periodically replace seals on washers and the door gasket.

- check hose connections

- clean lint screens to avoid clogging

- resetting control valves, adjusting process temperatures

- maintenance for laundry equipment, treatment processes, boilers, fleet vehicles

Good Housekeeping

- tight fitting lids on containers
 - prevent loss of chemicals through evaporation and spillage
 - prevent contamination of chemicals with water and dirt

- use spigots and pumps when dispensing new chemicals

- inspect and repair spigots to reduce leaking

Emissions, Disposal, Discharge

- Air Emissions from Boilers, Dryers and Heaters

- Disposal of:
 - Containers
 - Still Bottoms
 - Filter Muck
 - Cooker Muck
 - Cartridges
 - Sludge and Settlings

- Sewer Discharges

Solid Waste Management

- work with suppliers to reduce packaging
- reuse hangers
- returnable drums or bulk containers

Approach to Wastewater Treatment

Awareness of local sewer use by-laws.

Laundry wastewater parameters of concern for municipal sewer use by-laws are: suspended solids, pH, BOD, oil and grease, metals, volatile organic compounds (VOC).

Determining the appropriate equipment and pretreatment chemical requirements can involve the following typical steps...

Step 1 Analysis / assessment

- Responsible to know what is coming out of your plant
- Define your needs and options

Step 2 Consider supplier assistance vs consultant assistance

- advantages of supplier assistance
- advantages of consultant assistance

Step 3 Process Considerations

- limits system must achieve
- equalization
- pH, temperature
- chemical treatment
- sludge disposal
- source of system
 - single
 - multiple
 - performance responsibility
 - turn-key

Step 4 Pilot Demonstration

- verifies clarification technique
- ensures chemical pretreatment results
- indicates system cost/gallon
- sludge characteristics and disposal requirements

Costs

Capital costs

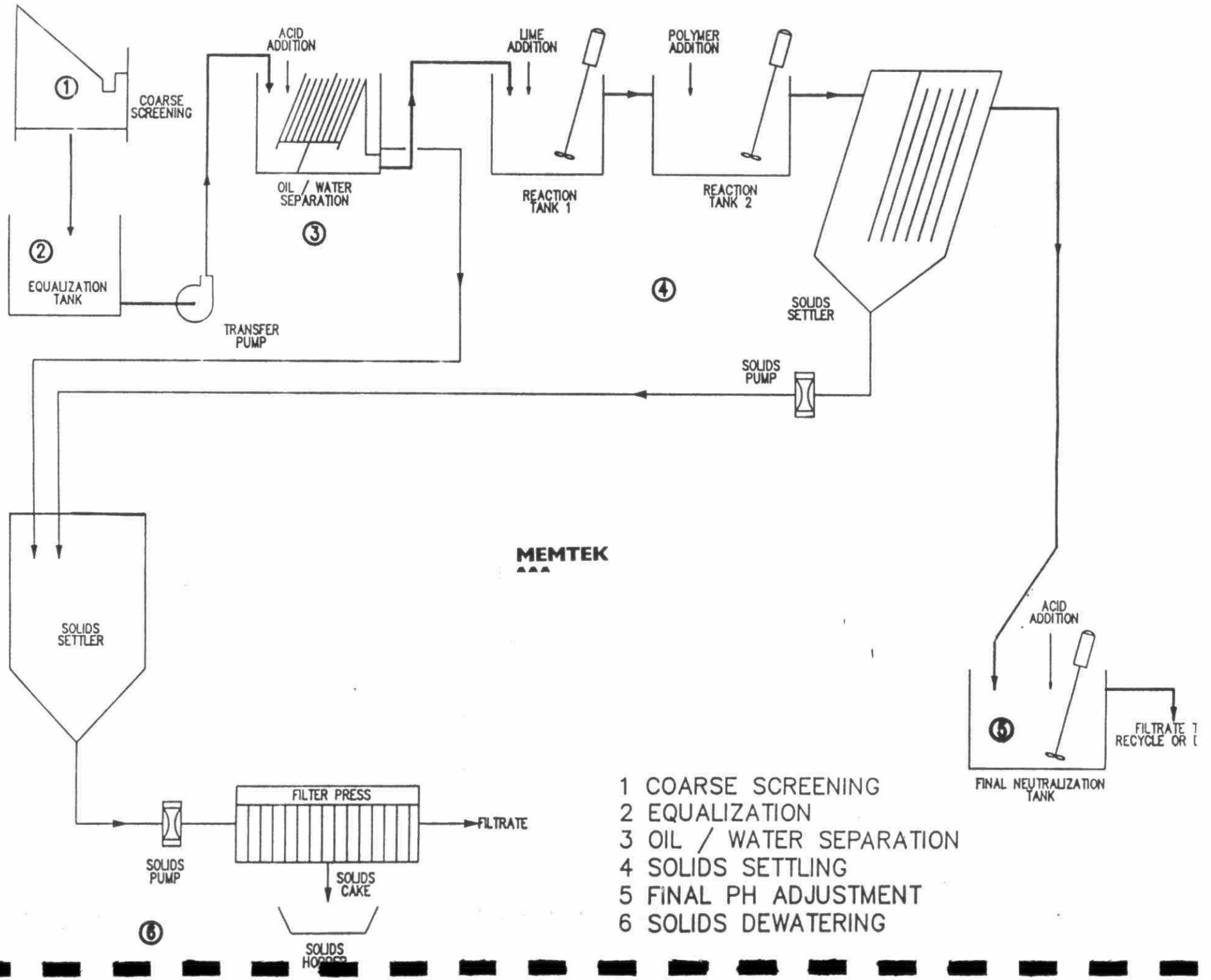
- new building additions to house equipment
- equalization tanks
- pumps, piping
- pretreatment equipment

Laundry Wastewater Treatment Technologies (1994 survey)

Effluent Parameter	Technology and Equipment Type		Equipment Capital Costs ($CAN) Based on 100 gpm flow
Heat	Heat Exchangers		
Suspended Solids	Screens		
	Settling		$75-$120,000.00
	Clarifier		($51,000.00 was a low)
	Precoat Vacuum Filtration		
	Dissolved Air Floatation		
	Ultrafiltration		$240-360,000.00
pH	Acid Addition		$22,500.00
	CO_2 injection		
BOD	Biological + Membranes		$900,000.00
Oil and Grease			
Floating	Skimmers		
Emulsified	Chemical Addition	Flow equalization tanks	$50-$60,000.00
		Chemical feed tanks,	$5-$15,000.00
		pumps, mixing tanks	$8-$15,000.00
	Oil/Water Separator		$49,000.00
	Acid Crack and Separate		$60-75,000.00
	Dissolved Air Floatation		$100-$185,000.00
	Inclined Plate Clarifiers		$80,000.00
	Ultrafiltration		$240-$500,000.00
	Microfiltration		$150-175,000.00
Metals	Solids Settling with	Flow equalization tanks	$50-$60,000.00
	chemical addition	Chemical feed tanks,	
		pumps, mixing tanks	$75,000.00
		Flocculation tanks	$80,000.00
		Clarifier	
		Sludge dewatering	
		Plate and frame filter press	$50-75,000.00
		Vacuum Filters	$100,000.00
		Sludge tanks	$17-$25,000.00
VOC	*Pre-washing*		
	Wringers		
	Centrifugal Extractors		
	VOC Stripper		
	Post-washing		
	Carbon Adsorption		

NOTES:

* This list is not complete, and there may be other technologies available.
* The Capital cost represents a range from seven manufacturers who responded to a recent survey.
* Pilot testing is available from the manufacturers who responded to the recent survey. A company can expect to pay $2- $3,000.00 for a pilot test.
* All manufacturers who responded to the survey had a reference list available of laundry facilities where their equipment was installed. Supplier maintenance service was also available.
* Pretreatment chemicals are necessary for allowing removal of certain contaminants. Pretreatment chemical costs for removing oil & grease to 15 ppm mineral, 150 ppm animal/veg. are in the order of $2-$5.00 / 1,000 gal for influent concentrations of 1000 ppm to 8,000 ppm respectively.
* Each laundry facility's requirements are unique and should be discussed with the equipment supplier.


ACID ADDITION
LIME ADDITION
POLYMER ADDITION
COARSE SCREENING
OIL / WATER SEPARATION
REACTION TANK 1
REACTION TANK 2
EQUALIZATION TANK
TRANSFER PUMP
SOLIDS SETTLER
SOLIDS PUMP
MEMTEK
SOLIDS SETTLER
ACID ADDITION
FILTRATE
RECYCLE OR
FINAL NEUTRALIZATION TANK
FILTER PRESS
FILTRATE
SOLIDS PUMP
SOLIDS CAKE
SOLIDS HOPPER
1 COARSE SCREENING
2 EQUALIZATION
3 OIL / WATER SEPARATION
4 SOLIDS SETTLING
5 FINAL PH ADJUSTMENT
6 SOLIDS DEWATERING

Costs

Operating Costs

- treatment chemical costs
- labour
- utilities
- sludge disposal costs

Wastewater Equipment Manufacturers/Suppliers

For an updated list of many Ontario suppliers, contact:

The Ontario Pollution Control Equipment Association
P.O. Box 137,
Midhurst, Ontario L0L 1X0
Phone (705) 725-0917
Fax (705) 725-1068

Request laundry wastewater equipment suppliers list from:

Uniform & Textile Service Association (formerly Industrial Laundry Association)
Suite 610,
1730 M Street, NW,
Washington, DC 20036
Phone (202) 296-6744
Fax (202) 296-2309

CONSULTING FIRMS IN INDUSTRIAL WASTE FIELD
IN METROPOLITAN TORONTO AND FRINGE AREA

(DECEMBER, 1993)

This list is by no means complete, and there may be others in the area capable of undertaking projects in the industrial waste treatment field.

ACG TECHNOLOGY LTD.
2175 Dunwin Drive, Unit 5
Mississauga, Ontario
L5L 1X2
Tel: (416) 828-7450
(Plating Waste)

ACT CANADA INC.
7686 Kimbel St., Unit 9
Mississauga, Ontario
L5S 1E9
Tel: (416) 812-0220

R. V. ANDERSON ASSOCIATES LTD.
1210 Sheppard Avenue East
Suite 401
North York, Ontario
M2K 1E3
Tel: (416) 497-8600
(Consulting Engineers)

BARRINGER RESEARCH LTD.
304 Carlingview Drive
Rexdale, Ontario
M9W 5G2
Tel: 677-3870
(Consulting & Laboratory)

BEAK CONSULTANTS LTD.
14 Abacus Road
Brampton, Ontario
L6T 5B7
Tel: (416) 794-2325

BECKART ENGINEERING INC.
c/o H. R. Matoesian
1917 Avenue Road
Toronto, Ontario
M5M 4A2
Tel: (416) 665-3252
(Batch Treatment Systems)

BEWT METAL RECOVERY SYSTEMS LTD.
1390 Hopkins Street, Unit 5
Whitby, Ontario
L1N 2C3
Tel: (416) 430-7666

BIG BEAR SERVICES (1980) LTD.
Suite 216, Westmount Place
Waterloo, Ontario
N2L 2R5
Tel: (519) 886-4400
(On-site Sludge Dewatering)

B. & R. ENGINEERING CO. LTD.
6 Marconi Court
Bolton, Ontario
L7E 5S6
Tel: (416) 495-0111
Fax: (416) 495-1212

CANADIAN AIR COMPRESSOR LTD.
57 Atomic Avenue
Toronto, Ontario
M8Z 5K8
Tel: (416) 252-9505
Fax: (416) 252-9228
(Oil/Water Separators)

CARBONE LORRAINE CORPORATION
225 Boul. Harwood
Dorion, Quebec
J7V 1Y3

Toronto Office
Tel: (416) 293-4030
(Plating Waste Treatment)

CHEMQUANT LABORATORIES LTD.
1210 Lamy Court
Mississauga, Ontario
L4W 3N4
Tel: (416) 238-3302
(Analytical Instrumentation - Sales, Rental)

CMS ROTORDISK INC.
5255 General Road, Unit 12
Mississauga, Ontario
L4W 1Z7
Tel: (416) 625-8916
(Biological Treatment System)

CONTROL AND METERING LIMITED
One Westside Drive
Toronto, Ontario
M9C 1B2
Tel: 626-8411
(Wastewater Treatment System)

DAMES & MOORE, CANADA
7560 Airport Road
Mississauga, Ontario
L4T 2H5
Tel: (416) 671-9921
(The Environmental Professionals)

DEARBORN ENVIRONMENTAL CONSULTING SERVICES
P. O. Box 3060, Station "A"
Mississauga, Ontario
K5A 3T5
Telex: 06-961145

DELCAN ENVIRONMENTAL CONSULTANTS INC.
133 Wynford Drive
North York, Ontario
M3C 1K1
Tel: (416) 441-4111
Fax: (416) 441-4131

DILLON ENVIRONMENTAL LABORATORIES
215 Traders Boulevard East, Unit 3
Mississauga, Ontario
L4Z 2E5
Tel: (416) 568-1414
Fax: (416) 568-1339

DMP CORPORATION
4016 Promontory Drive
Mississauga, Ontario
L5L 3G6
Tel: (416) 828-1517

ECO EQUIPMENT INC.
74 Captain Rolph Court
Markham, Ontario
L3P 3K9
Tel: 472-2202
(Process Equipment for Water and Wastewater Treatment)

ECO-TEC LIMITED
925 Brock Road South
Pickering, Ontario
L2W 2X9
Tel: (416) 831-3400
(Chemical Recovery - Plating Wastes)

ENPOCO
405 Midwest Road
Scarborough, Ontario
M1P 3A6
Tel: (416) 751-9007
(Oil & Grease Interceptors)

ENVIROCLEAN LTD.
1220 Sheppard Avenue East
Willowdale, Ontario
M2K 2T8
Tel: 499-4544
(Consulting & Laboratory)

ENVIROMEGA LTD.
P. O. Box 1249
Burlington, Ontario
L7R 4L8
Tel: (416) 336-6464
Fax: (416) 336-4765
Environmental Engineering Services

ENVISION COMPLIANCE LTD.
150 Clark Blvd., Unit 132
Bramalea, Ontario
L6T 4Y8
Tel: (416) 790-6855
Fax: (416) 790-6845
(Environmental Services/Products)
(Plating Waste Treatment)

FILTREX
290 Garyray Drive
Weston, Ontario
M9L 1P4
Tel: (416) 747-6584
(Oil & Grease Interceptors)

FLUID DYNAMICS
105 Hollywood Drive
North York, Ontario
M2N 3K2
Tel: (416) 225-4300
(Magnetic Treatment Devices)

FREMCO ENVIRONMENTAL TECHNOLOGIES INC.
6 Homestead Court
Markham, Ontario
L3P 5C3
Tel: (416) 471-7351
(Plating Waste Recovery)

GORE & STORRIE LTD.
255 Consumers Road
North York, Ontario
M2J 5B6
Tel: (416) 499-9000
(Consulting & Laboratory)

GREENLINE ENVIRONMENT LIMITED
P. O. Box 8055, Station F
Calgary, Alberta
T2J 4V6

KENOX CORPORATION
250 Consumers Road, Suite 107
North York, Ontario
M2J 4V6
Tel: (416) 445-3600
(Consulting Engineers)

LIQUID AIR
1700 Steeles Avenue East
Bramalea, Ontario
L6T 1A6
Tel: (416) 793-2000
Fax: (416) 793-9257
CO_2 Neutralization of Alkaline Effluents

LSL CONSULTANTS LTD.
158 Kennedy Road
Brampton, Ontario
L6W 3G7
Tel: (416) 459-9631
(Consulting & Laboratory)

MACLAREN ENGINEERS INC.
2235 Sheppard Avenue East
Suite 300
Willowdale, Ontario
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(Recovery Equipment)

T. D. ROOKE ASSOCIATES LTD.
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(Plating Wastewater Treatment System)

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DRAFT

Pollution Prevention / Best Management Practices for Textile Laundry Facilities.

1) **Establish a written environmental policy statement**

Why implement pollution prevention/best management practices? What will be done? Who will implement it?

eg. At Clean-All Ltd., protecting the environment is a high priority. By successfully preventing pollution at its source, we can achieve cost savings, increase operational efficiencies, improve the quality of our service, maintain a safe and healthy workplace for our employees, and improve the environment. We encourage all employees to participate in reviewing all sources and types of waste at our facility and identify and implementing all possible (technically and economically feasible) opportunities to reduce our generation of waste.

2) **Establish a team within the facility to identify opportunities.** Include people from the different areas of the business.

ie.
- facility manger
- operator
- route sales
- shipping/receiving
- accounting

3) **Do a preliminary assessment**
- Gather information
- Review the work site
- Identify opportunities
- Establish priorities

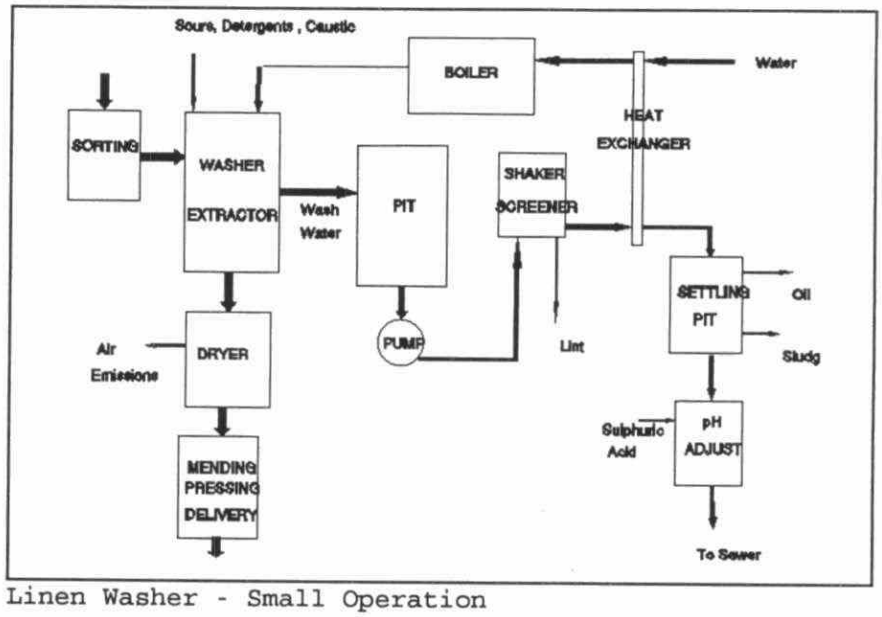
4) **Options**
- Identify
- Evaluate
- Implement

Preliminary Assessment

Gather Information

- Make a general plant flow diagram.

 - List inputs/outputs
 - amounts
 - material costs
 - waste sources



Linen Washer - Small Operation

- Establish what is in the discharge water.
 - Find out sampling results of your facility from your local municipality
 - Take a grab sample (split) for obtaining an idea of what is in your discharges. Look at by-law parameters.
 - Analyze for solvents if you expect them to be present (e.g. from printing wiper towels)

- Look at chemical use
 - Learn what chemicals are in your washes, breaks. Request and look at the Material Data Safety Sheets (MSDS) from your suppliers.

 Are you paying for a chemical, such as a solvent that you will have to remove later?

- Assess your customer base to determine where your troublesome parameters are coming from:

 eg. **mineral oil** can come from automotive, miscellaneous industrial, manufacturing customers...

 solvents can come from printers, furniture finishers...

Identify Opportunities

Front end removal of free liquids

Eliminate free-liquids coming to the plant

Ensure that no free-liquids are transported and processed in the laundries. Working with your customers to reduce free-liquids is the most effective method of eliminating free liquids.

Front End Treatment (solvent/liquid removal prior to water washing).

- Mechanical Extraction, VOC Stripper, Centrifuge.

Washing Chemicals

Purchasing (Substitute) Raw Materials

Instituting a comprehensive chemical review and purchasing program can save money and valuable resources and reduce toxics and waste.

- identify all process and treatment materials that you use in your facility and evaluate how much is going into the different processes and what residuals are exiting to all media

- By looking at the Material Safety Data Sheets (MSDSs) of cleaning chemicals (eg. detergents, sours, bleaches) you can determine which ones are incompatible with strong oxidizers. (e.g. laundry bleaches are strong oxidizers with the potential to release chlorine when mixed with acids, ammonia, oil, and liquid organic materials. Sours are incompatible with strong alkalies or chlorinated cleaners which may be present in laundry operations).

Handling and Storage

Safety meetings should focus on proper handling and storage of all process chemicals to avoid health hazards.

Automatic, liquid injection systems are available to reduce the handling of laundry chemicals.

Chemical Suppliers

Consider replacing your current raw materials with others that reduce the amount or toxicity of the waste that you generate.

Toxic use reduction in all process and treatment chemicals should be reviewed periodically with your suppliers and

vendors.

Management, environmental/safety staff, and suppliers need to continue asking why are these chemicals used and how can their hazards and toxicity be reduced for the laundries and their customers.

Inventory Controls

Standard procedures for inventory controls should be improved to ensure review of all chemical usage in the plant.

- usage of chemicals on a first-in first-out basis to prevent storage of products beyond their shelf life which creates waste.

- review all chemical usage in aerosol cans throughout the plant
 - order aerosol products according to demand. Expired shelf life may require excess inventories to be disposed.
 - keep aerosols away from moisture, sunlight and extreme heat and cold to increase shelf life.
 - purchase alternative aerosol products that do not contain CFCs.

Water conservation/reuse
Energy Conservation

- With a heat exchanger to capture heat from wash water, less energy is used for heating up incoming water. The volume of gas burner emissions is also reduced.
- By using warm water instead of cold for rinsing, more effective rinsing is obtained and the rinse times and volume of water used is decreased. In this way, water consumption can be reduced by about 20%.

Good Housekeeping

Large amounts of solid and/or hazardous waste may be generated through spills and leaks, improper storage practices, inefficient production start-up or shut-down, scheduling problems, lack of emergency procedures and preventative maintenance, or poorly calibrated devices for pollution control processes.

Good housekeeping measures can greatly decrease the amount of wastes that are generated. To reduce excess waste production:

- Keep tight fitting lids and bungs on containers to prevent loss of chemicals through evaporation and spillage. Keeping lids on containers also prevents contamination with water and dirt.

- Use spigots and pumps when dispensing new materials and funnels when transferring wastes to storage containers to reduce the possibility of spills.

- Inspect spigots routinely to reduce leaking and clean up time. If adsorbents are used, a waste is being generated and raw materials are lost.

- Store products in locations that will preserve their shelf life.

- Accumulate wastes indoors or in a covered area to prevent moisture from seeping in.

- Never mix different types of waste together. Mixing wastes may make recycling impossible, or make waste disposal much more expensive.

- make sure that personnel are well trained and aware of operating practices that reduce waste generation.

If you are using adsorbents, select adsorbents that are wringable and can be reused more than once to reduce raw materials loss, disposal costs and clean-up time. Check with your landfill authorities to determine if they will accept certain adsorbents containing chemicals.

Maintenance and Preventative Maintenance

- Corrective maintenance, such as resetting control valves or adjusting process temperatures, will increase efficiency and prevent raw material and energy loss through waste streams.

- Preventative maintenance helps reduce down-time and wastes produced during the procedure.

- Liquid and laundry chemical leaks can be eliminated by conducting a regular maintenance program including:

 - Periodically replacing the seals on the washers and the door gasket.

 - Checking hose connections and couplings

 - Cleaning lint screens to avoid clogging

- Maintenance operations can be done for laundry and dry cleaning equipment, treatment processes, boilers and fleet vehicles.

Training

- **owners/operators**
 - have to educate the smaller operators in identifying and addressing the problems.
 - owners need to become aware of their responsibilities towards chemical usage. (It was noted that insurance no longer covers environmental liabilities)
 - need to learn about how to read and identify unwanted chemicals on MSDSs.
- **Suppliers**
 - need to educate chemical sales people in what is environmentally acceptable to the laundries.
- **Customers**
 - need to be aware of methods to reduce the problem soils in the garments.
 - educate customers via "No free-liquids training", and better chemical usage awareness.

Solid Waste Management

Reduce the number of empty cans, bags, drums and pallets

Laundry, treatment and dry cleaning chemicals are received in bags, cardboard boxes and all types of drums.

- look at alternative packaging in larger containers

- determine the number of drums generated and track their handling and storage procedures and costs.

- negotiate with your supplier to use returnable drums or bulk containers to ship materials

- automated, liquid injection systems may allow the use of reusable, bulk containers -tote- which reduce solid waste of drums after chemical usage.

- drums
 - return empty drums to chemical supplier
 - drum reconditioners
 - if disposal is necessary, consider sending to scrap metal vendors

- pallets can be advertised on waste exchanges

Vendor/supplier procurement procedures

- considerations and requirements for reducing solid waste from shipping and packaging materials.

- better specifications in contracting can save money in reduced solid waste costs and ensure the reuse, recyclability and high post-consumer content of all shipping and packaging

materials received.

Hazardous Waste Management

Sump sludge should be looked at more carefully. Its hazard potential is often ignored. Metals such as cadmium can result from metal plating customers; lead can come from batteries. A leachate test should be done on the sludge.

Solvent recovery from textiles can have significant management and disposal costs.

Process equipment

Simple process equipment can significantly reduce waste.

Installation of a shaker screener can remove suspended solids from the wastewater.

Textile Use, Collection, Transportation

Textile Use

- Textiles can be used for all purposes that are incidental to the customer's normal activities. The customer shall not use textiles to clean up spills of hazardous waste, as defined by applicable regulations.

- The customer shall not pour excess solvents or any other chemicals onto textiles as a means of disposing of excess solvents or chemicals.

- A collection system must be used that complies with all applicable regulations.

Soiled Textile Collection

- If the soiled textile bears free liquid, the customer should use a collection system or other process to remove this free liquid.

- If the soiled textile does not bear free liquid, it may be placed in a soiled textile holder outside of a collection system prior to transporting it to the textile launderer.
 Note: Soiled textiles that do not bear free liquid may, when placed in a soiled textile holder, accumulate free liquid as gravity pulls liquid from soiled textiles at the top of the soiled textile holder onto soiled textiles at the bottom of the soiled textile holder. If the customer determines that

free liquid is accumulating on soiled textiles in a soiled textile holder, the customer must place the textiles bearing free liquid into a collection system until the textiles no longer bear free liquid.

Soiled Textile Transportation

- The customer and textile launderer shall ensure that textiles bearing free liquid will not be transported.

- The textile laundry should refuse to accept or transport any textiles bearing free liquid.

 The textile launderer will discuss the incident with the customer to prevent future occurrences.

Transportation of dangerous goods legislation limits the amount of hazardous waste per truckload.

- What steps are taken in getting the soiled textiles to the loading bay?

- What steps are taken once at the loading bay involving sorting and counting the pieces?

Wiping Towels

Special practices required when dealing with wiping towels

- Make sure that used shop towels with hazardous solvents are collected, transported and stored in closed containers. Storage shall be in containers that are in good condition and labelled with the words "contaminated shop towels". There shall be adequate separation between containers to allow access of emergency equipment in case of fire. It is your responsibility to ensure that containers are compatible with the materials stored in them.

 Use of special containers to collect soiled wiping towels:

 (1) nylon bags or other liquid-permeable bags that hold soiled textiles but allow free liquid to collect in the collection system and not to collect onto the soiled textiles, or
 (2) plastic bags or other containers, impermeable to liquid, in which soiled textiles not bearing free liquid are stored and/or transported.

- Containers holding flammable materials must be managed according to all local fire department standards. They must be sufficiently separated from all external sources of ignition. "No smoking" signs shall be legible and placed at all accumulation areas. Such areas must meet the minimum

property line setback requirements. Container type, colour and labels must also meet local fire department codes.

- The owner/operator must ensure that all employees are thoroughly familiar with proper waste handling, and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies. Employees must know the location of all fire extinguishers and fire alarms and the telephone number of the fire department must be clearly visible next to all emergency communication devices such as telephones.

- Sales staff and route salespeople should be trained to deal with customers who have solvent soiled textiles to explain
 - when and why they can take shop towels
 - proper collection systems or liquid extraction equipment at the customer's facility
 - have there been any instances or problems with liquids in transit from the customer to the laundry?
 - can a list of chemicals used by the customer be provided before the initial pick up of soiled textiles and where should that list reside?
 - What trigger mechanisms are in place at the laundry to ensure that the target pollutants in soiled textiles are reviewed by management and environmental/safety staff prior to contracting with a potential client?

References

"Management Practices for Soiled Reusable Textile Handling", Institute of Industrial Launderers/Textile Rental Services Association of America, 1992

"Focus - Used Shop Towels", Washington State Department of Ecology, 1992

"P2 Strategies for Industrial Laundries: Assessment observations and waste reduction options.", Cam Metcalf, U. of Tennessee's Centre for Industrial Services, for the U.S. EPA, 1993.

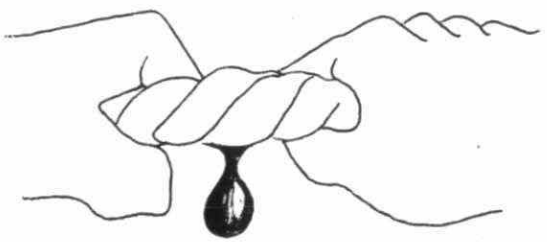
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Textile Handling Practices

For Laundry Customers Using Wiping Towels

DO's

- ✓ Use non-hazardous cleaning solvents whenever possible.
- ✓ Ensure no towels bearing free liquids are placed in soiled towel containers.
- ✓ Wring out soiled towels before placing in collection containers, either by hand or with a mechanical device.
- ✓ If excess liquid collects at the bottom of the container, decant into a waste collection drum and manage the liquid appropriately.
- ✓ Share your Material Safety Data Sheets with the laundries.



DON'Ts

- ☹ Don't air dry soiled wiping towels.
- ☹ Don't dispose of excess chemicals by pouring onto towels.
- ☹ Don't pre-wash wiping towels on your own.



The laundry industry values you as customers and is doing its best to promote pollution prevention in its operations. These suggestions are offered as methods to help laundry customers using reuseable wiping towels participate in preventing pollution at source.

Remember that properly managed and laundered cloth wiping towels are recyclable and are a better choice than disposable synthetic or paper towels that add to solid waste problems.

1994

Ontario Laundry Industry Pollution Prevention Task Force

Laundry Industry Workshop - Registered Participants, as of February 23, 1994

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